Amendments to the Claims:

This listing of the claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 33-47 (Canceled)

48. (Currently Amended) ~~An~~ A multi-cavity thin-film interference filter comprising a sequence of alternating layers of amorphous silicon and a dielectric material deposited one on top of the other to form a tunable bandpass filter, said sequence of alternating layers forming coupled Fabry-Perot cavity structures including at least a first Fabry-Perot cavity structure and a second Fabry-Perot cavity structure, each of said first and second Fabry-Perot cavity structures ~~optical filter comprising a Fabry-Perot cavity structure, said Fabry-Perot cavity structure~~ comprising:

a first multi-layer thin film interference ~~filter that forms~~ structure forming a first mirror;

a thin-film spacer layer deposited on a top surface of the first multi-layer thin-film interference structure, said thin-film spacer layer made of said amorphous silicon; and

a second multi-layer thin film interference ~~filter that forms~~ structure deposited on a top surface of the thin-film spacer layer and forming a second mirror ~~; and~~

~~a spacer layer separating the first and second mirrors, wherein said Fabry-Perot cavity structure includes at least one layer made of a semiconductor material having a thermo-optic coefficient that is sufficiently large to cause the optical filter to function as a thermally tunable bandpass filter, wherein at least one the spacer layer and the first and second mirrors includes a layer made of a semiconductor material having a thermo-optic coefficient that is sufficiently large so that the optical filter functions as a thermally tunable bandpass filter~~.

49. (Currently Amended) The multi-cavity thin-film interference ~~optical~~ filter of claim 48 wherein the thin-film spacer layer in the first and second Fabry-Perot cavity structures is made of amorphous silicon ~~said semiconductor material~~.

Claim 50 (Canceled).

51. (Currently Amended) The multi-cavity thin-film interference ~~optical~~ filter of claim 48 further comprising a heater element that is arranged to heat said at least one layer made of said semiconductor material so as to vary in a controllable way the filter characteristics of the optical filter.

Claims 52-59 (Canceled)

60. (New) The multi-cavity thin film interference filter of claim 48, wherein the dielectric material is silicon nitride.

61. (New) The multi-cavity thin film interference filter of claim 60, further comprising a layer of thermally conductive material to which, during use, power is supplied by an external source to change the temperature of the multi-cavity thin film interference filter and thereby shift the passband of the multi-cavity thin film interference filter.

62. (New) The multi-cavity thin film interference filter of claim 61, further comprising a substrate on which the first multi-layer thin film interference structure of the first Fabry-Perot cavity structure is deposited, wherein said layer of thermally conductive material forms a ring heater on the substrate and circumscribing an optical path through the first and second Fabry-Perot cavity structures, wherein during use the power that is supplied to the ring heater is electrical power.

63. (New) The multi-cavity thin film interference filter of claim 61, further comprising a crystalline semiconductor substrate on which the first multi-layer thin film interference structure of the first Fabry-Perot cavity structure is deposited, wherein said layer of thermally conductive material is a doped upper region of said substrate, wherein during use the power that is supplied to the doped upper region is electrical power.

64. (New) The multi-cavity thin film interference filter of claim 61, further comprising a substrate and a heater film formed in the substrate, wherein the first multi-layer thin film interference structure of the first Fabry-Perot cavity structure is deposited on the heater film, wherein said layer of thermally conductive material is said heater film and wherein during use the power that is supplied to the heater film of is electrical power.

65. (New) The multi-cavity thin film interference filter of claim 61, wherein said layer of thermally conductive material is one of the layers of the multi-cavity thin film interference filter.

66. (New) A method of fabricating a multi-cavity thin film interference filter comprising depositing a sequence of alternating layers of amorphous silicon and a dielectric material deposited one on top of the other to form a tunable bandpass filter, said sequence of alternating layers forming coupled Fabry-Perot cavity structures including at least a first Fabry-Perot cavity structure and a second Fabry-Perot cavity structure, each of said first and second Fabry-Perot cavity structures including a first multi-layer thin film interference structure forming a first mirror; a thin-film spacer layer deposited on a top surface of the first multi-layer thin-film interference structure, said thin-film spacer layer made of said amorphous silicon; and a second multi-layer thin film interference structure deposited on a top surface of the thin-film spacer layer and forming a second mirror.

67. (New) The method of claim 66 wherein depositing the sequence of alternating layers involves using only PECVD to deposit the sequence of alternating layers.